

2-1949

# Supplement to Odor Report

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1949 SUPPLEMENT  
to  
SOME OBSERVATIONS ON ODOR INTENSITY  
in the  
Lewiston - Auburn Area  
1943, 1944, 1945, and 1946  
and  
COMPARISONS WITH OTHER DATA

BY  
WALTER A. LAWRANCE

October, 1949  
Lewiston, Maine

### SUMMARY

1. In order of decreasing odor intensity, the past seven years may be arranged as 1944, 1947, 1943, 1940, 1945, 1948 and 1949.
2. The 1949 maximum weekly odor intensity number was thirty-one and when compared with that of seventy-nine for the week ending August 3, 1944, one can roughly measure the improvement which has been made.
3. The data obtained during 1949 have been added to the appropriate tables first recorded in the report of 1948.
4. When comparing the 1949 and 1948 data with those of other years, allowance must be made for the addition of sodium nitrate to the water.

1949 Supplement  
to  
Some Observations on Odor Intensity  
In the Lewiston - Auburn Area  
and  
Comparisons with Other Data

Objectives. The objectives of this supplementary are to,

1. include the data obtained during 1949 in the appropriate table\* of the original report,
2. present some of the data in graphical form to facilitate comparison with the experience obtained in previous years.

Comparison of Odor Intensity Numbers 1943 to 1949 incl. The odor intensity numbers for 1949 are so uniformly low that there can be no question about recording it as the most favorable of the seven years of record. The data presented in Tables #2, #3, and #3A, are the basis for recording, in order of decreasing odor intensity, the past seven years as 1944, 1947, 1943, 1946, 1945, 1948 and 1949.

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\*Where possible the numbers of the tables contained in this supplement are identical with the comparable tables presented in the original report made in November 1946.

Table #2

Odor Intensity Duration  
Weeks in each Range.

	1949	1948	1947	1946	1945	1944	1943
Range 1	15	14	7	7	10	4	5
Range 2	0	1	4	3	3	3	4
Range 3	0	0	2	5	3	5	7
Range 4	0	0	3	0	0	4	0
Total Weeks	15	15	16	15	16	16	16

Range one includes odor intensity numbers from zero to forty-two and is best described as "odor scarcely noticeable". The river odor intensity in downtown Lewiston and Auburn during the summer of 1949 was entirely within this range. Since hydrogen sulfide was not present in the odor and pig-pen much less frequent, the type of odor as well as the intensity was not disagreeable.

The 1949 monthly averages reveal that there was a constant low odor level from the middle of June through August. The September odor intensity was the lowest monthly average recorded in the seven years of observations. The June odor level was slightly higher in 1949 than in 1948 and 1947.

Table #3A

Average Monthly  
Odor Intensity Numbers.

	1943	1944	1945	1946	1947	1948	1949
June	45x	42x	33x	35x	24xx	24xx	29xx
July	55	42	35	50	32	38	28
Aug.	44	66	47	47	56	32	28
Sept.	42	46	35	36	49	30	18

x three weeks

xx two weeks.

Table #3

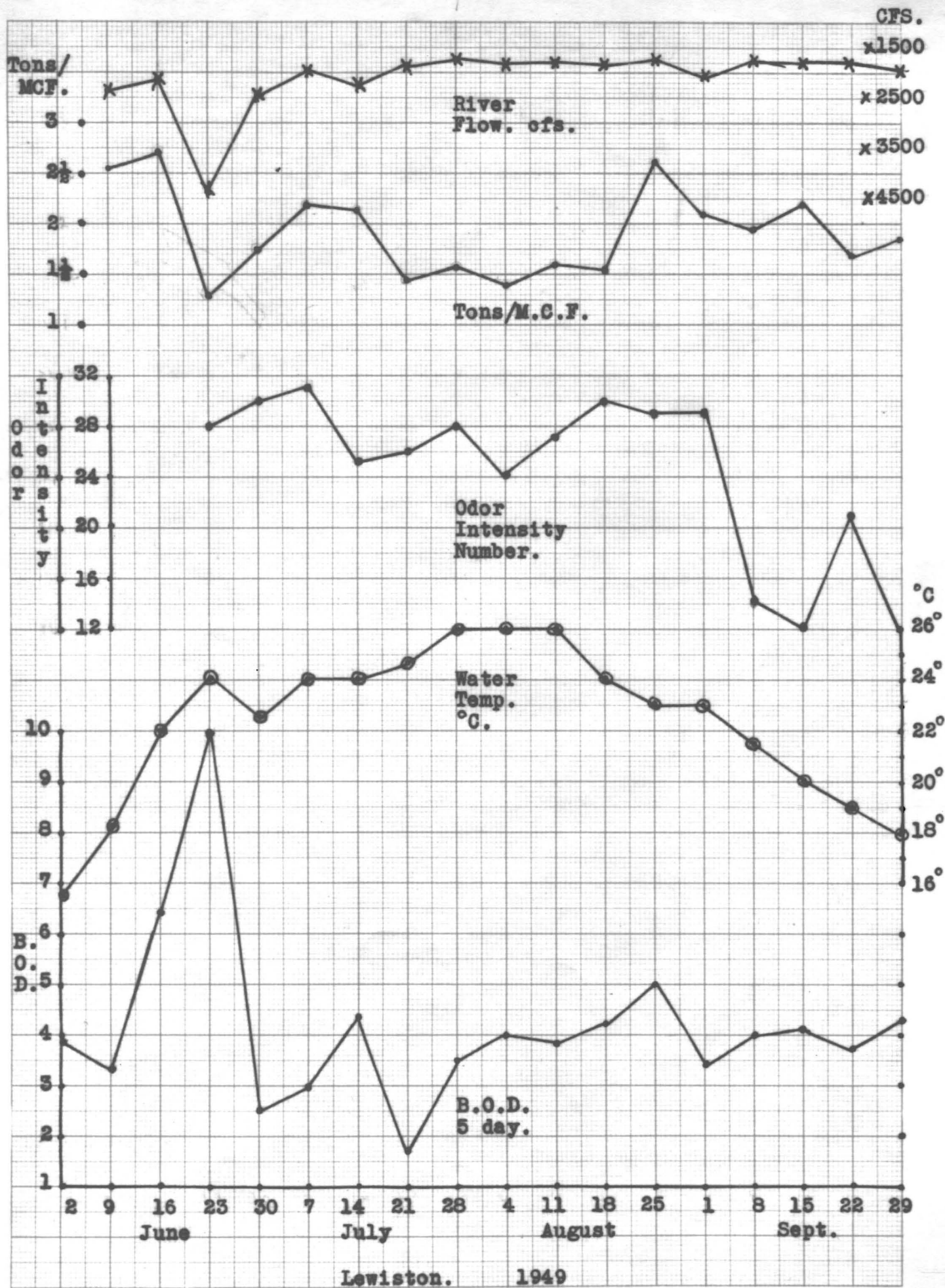
Comparison of Odor  
Intensity Numbers.

	43	44	45	46	47	48	49	1943	1944	1945	1946	1947	1948	1949
June	17	15	14	13	12	17	16	50	39	29	--	--	--	--
	24	22	21	20	19	24	23	44	45	35	30	23	18	28
	1*	29	28	27	26	1*	30	41	43	34	40	24	29	30
July	8	6	5	4	3	8	7	58	27	27	49	29	33	31
	15	13	12	11	10	13	14	56	33	30	57	19	41	25
	22	20	19	18	17	22	21	59	51	36	51	28	42	26
	29	27	26	25	24	29	28	47	55	37	41	35	35	28
Aug.	5	3	2	1	31*	5	4	50	79	42	56	48	37	24
	12	10	9	8	7	12	11	40	69	49	52	41	41	27
	19	17	16	15	14	14	13	40	62	50	46	53	34	30
	26	24	23	22	21	26	25	42	68	49	39	65	25	29
	2*	31	30	29	28	2*	1	49	52	46	45	69	27	29
Sept.	9	7	6	5	4	9	8	52	55	37	38	65	30	14
	16	14	13	12	11	16	15	43	56	45	22	49	38	12
	23	21	20	19	18	23	22	40	42	32	40	42	30	21
	30	28	27	26	25	30	29	31	37	24	45	48	23	12
Oct.					2							42		
Total of Intensity Numbers								732	813	602	651	680	483	366
Number of weeks.								16	16	16	15	16	15	15
Average weekly Intensity number.								46	51	38	43	43	32	24
Maximum weekly Intensity number.								58	79	59	57 56	69	48 41 41	31
Maximum odor down- town during week ending.								7/8	8/3	8/16	7/11 8/1	8/28	7/22 7/15 8/12	*

\* Statistically, July 7, but not materially different from some other weeks.

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Lewiston. 1949

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Should the odor intensity number be used as a basis of comparison of the odor situation, then the years in order of decreasing odor are 1944, 1943, 1946, 1947, 1948 and 1949.

Pollution load factors. These numbers were obtained by dividing the number of millions of cubic feet of water passing Gulf Island Dam each week by the compensated tonnage of sulfite pulp produced. The pollution load factor is, of course, tons of pulp per million cubic feet of water and the number reflects changes in production or river flow or both. The average pollution load factor for the past seven summer periods are listed in Table P.L.F. #1.

Table P.L.F. #1  
Pollution Load Factor  
(Average)

Year	Period	P.L.F.
1943	July 1 - Sept. 16	1.90
1944	June 15 - Sept. 28	2.60
1945	June 14 - Sept. 27	2.09
1946	June 13 - Sept. 26	2.38
1947	June 19 - Oct. 2	2.07
1948	June 17 - Sept. 30	2.03
1949	June 16 - Sept. 29	1.88 *

1949 June air and water temperatures were so high and with the flow abnormally low, the quality of the river water rapidly deteriorated owing to the high load then present. The dissolved oxygen was consistently low and non-existent in a few areas. Hydrogen sulfide was formed in sufficient

\* Does not include I. P. Company's production,



Table P.L.F. #2

1949 Weekly Pollution Factors \*

Date Wk ending	Over c.f.s.	M.C.F.	Comp. Production tons	T/M.C.F. P.F.
5 June 5	-----	-----	-----	-----
12 June 12	2371	1434	3675	2.56
19 June 19	2117	1280	2495	2.70
26 June 26	4399	2660	3462	1.30
3 July 3	2457	1486	2595	1.74
10 July 10	1941	1174	2591	2.20
17 July 16	2187	1323	2330	2.18
24 July 24	1874	1133	1653	1.46
31 July 31	1727	1045	1659	1.59
7 Aug. 7	1838	1112	1541	1.39
14 Aug. 14	1797	1087	1732	1.59
21 Aug. 21	1831	1107	1691	1.53
28 Aug. 28	1740	1056	2788	2.62
4 Sept. 4	2087	1292	2750	2.11
11 Sept. 11	1766	1068	2099	1.96
18 Sept. 18	1776	1074	2396	2.21
25 Sept. 25	1833	1109	1441	1.65
2 Oct. 2	1960	1185	2150	1.80

quantities in the southern end of the pond to give rise to widespread coverage on two occasions. Very high B.O.D. loads were recorded during the week of June 23. However, an increase in flow, reduction in pollution load and the use of sodium nitrate greatly reduced the odor level in the pond areas.

The months of July and August were hot and dry but the somewhat lower pollution load together with the use of sodium nitrate kept the river odor in downtown Lewiston and

\* Does not include I. P. Company's production.

Table  
Compensated Sulfito Production

1949

Brown Company

Oxford Paper Co.

Total

Approx.  
date at  
G. I. D.

May 20 238  
 21 246  
 22 280  
 23 273  
 24 280  
 25 279  
 26 285  
 27 272  
 28 280  
 29 52  
 30 280  
 31 275  
 June 1 274  
 2 265  
 3 280  
 4 273  
 5 57  
 6 255  
 7 264  
 8 275  
 9 275  
 10 275  
 11 255  
 12 86  
 13 119  
 14 129  
 15 128  
 16 131  
 17 131  
 18 147  
 19 161  
 20 163  
 21 165  
 22 166  
 23 158  
 24 154  
 25 177  
 26 262  
 27 264  
 28 262  
 29 280  
 30 264

May 23 251  
 24 234  
 25 271  
 26 262  
 27 261  
 28 260  
 29 273  
 30 199  
 31 217  
 June 1 283  
 2 281  
 3 259  
 4 203  
 5 279  
 6 267  
 7 236  
 8 263  
 9 264  
 10 233  
 11 258  
 12 262  
 13 252  
 14 259  
 15 251  
 16 234  
 17 167  
 18 253  
 19 247  
 20 205  
 21 230  
 22 224  
 23 220  
 24 273  
 25 250  
 26 132  
 27 148  
 28 246  
 29 271  
 30 222  
 July 1 187  
 2 155  
 3 0

539  
 480  
 551  
 535  
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June 5  
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Table  
Compensated Sulfito Production  
 1949

Brown Company			Oxford Paper Co.			Total		Approx. date at C.I.D.
July	1	290	July	4	0	290	July	17
	2	0		5	211	211		18
	3	0		6	236	236		19
	4	0		7	200	200		20
	5	0		8	253	253		21
	6	0		9	233	233		22
	7	0		10	256	256		23
	8	0		11	264	264		24
	9	0		12	250	250		25
	10	0		13	233	233		26
	11	0		14	245	245		27
	12	0		15	242	242		28
	13	0		16	226	226		29
	14	0		17	229	229		30
	15	0		18	234	234		31
	16	0		19	237	237	Aug.	1
	17	0		20	243	243		2
	18	0		21	233	233		3
	19	0		22	275	275		4
	20	0		23	202	202		5
	21	0		24	118	118		6
	22	0		25	233	233		7
	23	0		26	220	220		8
	24	0		27	244	244		9
	25	0		28	248	248		10
	26	0		29	248	248		11
	27	0		30	265	265		12
	28	0		31	259	259		13
	29	0	Aug.	1	248	248		14
	30	0		2	193	193		15
	31	0		3	135	135		16
Aug.	1	0		4	126	126		17
	2	56		5	128	184		18
	3	231		6	114	345		19
	4	208		7	143	381		20
	5	281		8	76	357		21
	6	273		9	123	396		22
	7	285		10	137	422		23
	8	283		11	205	488		24
	9	258		12	244	502		25

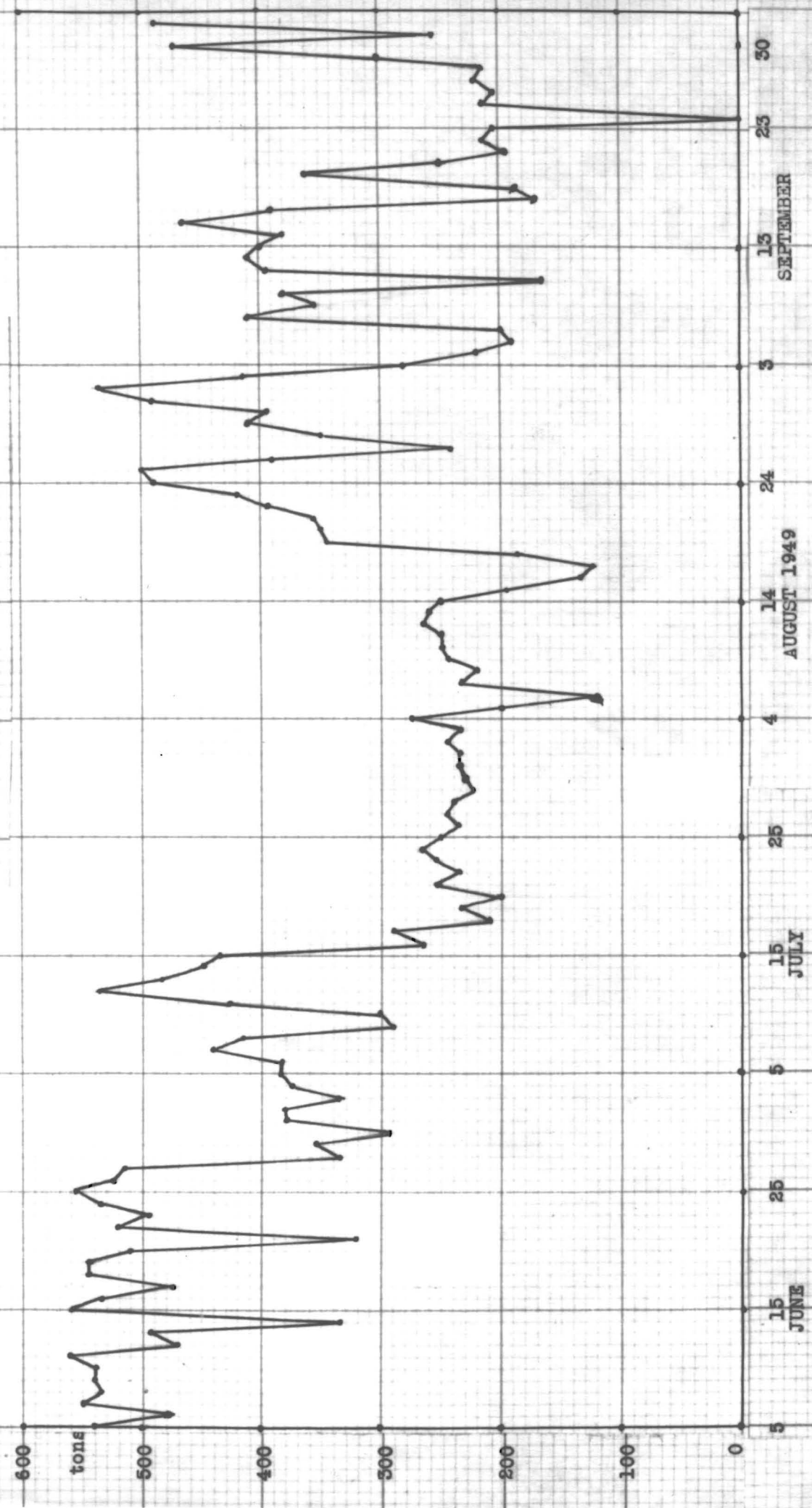
Table  
Compensated Sulfite Production  
1949

Brown Company		Oxford Paper Co.		Total	Approx. date at C.I.D.
Aug. 10	274	Aug. 13	116	390	Aug. 26
11	238	14	0	238	27
12	261	15	191	352	28
13	139	16	271	410	29
14	136	17	259	395	30
15	245	18	246	491	31
16	273	19	263	536	Sept. 1
17	285	20	131	416	2
18	281	21	0	281	3
19	0	22	221	221	4
20	0	23	188	188	5
21	8	24	190	198	6
22	163	25	245	408	7
23	170	26	195	365	8
24	170	27	210	380	9
25	166	28	0	166	10
26	167	29	227	394	11
27	183	30	225	408	12
28	181	31	219	400	13
29	180	Sept. 1	200	380	14
30	271	2	195	466	15
31	186	3	204	390	16
Sept. 1	169	4	0	169	17
2	183	5	0	183	18
3	182	6	180	362	19
4	21	7	228	249	20
5	0	8	195	195	21
6	0	9	215	215	22
7	0	10	206	206	23
8	0	11	0	0	24
9	0	12	214	214	25
10	0	13	204	204	26
11	0	14	218	218	27
12	0	15	217	217	28
13	90	16	212	302	29
14	250	17	220	470	30
15	256	18	0	256	Oct. 1
16	280	19	203	463	2

ANDROSCOGGIN RIVER

1949

COMPENSATED SULFITE PULP PRODUCTION tons



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Auburn not only low in intensity but of a much less objectionable type of odor.

The early part of September was hot but soon temperatures lowered. The rains came late and the ground was too dry to prevent much run off. River flows did not materially increase until it was too late to influence the odor situation.

In spite of all the unfavorable factors, the odor levels were very much lower than those recorded prior to 1948 and lower than those of 1948. The highest weekly odor intensity number was thirty-one, a much lower number than any previous maximum.

Although the odor level at Gulf Island Dam was less intense this year, the sulfide present at the time of the early morning "start up" and for an hour or two thereafter, was, at times, at objectionable concentrations. A practical solution of this problem should be sought for during 1950.

For the first time in many years, the downtown districts and all of the residential areas, save those just adjacent to the Dams, were practically free from objectionable river odor.

Table #8  
Lexington, 1949

Date		B.O.D. 5 day	Water temp. C.	Odor Intens.	River flow c.f.s.*	Compen. Tons per M.C.F.*
June	2	3.88	18.8	--	----	----
	9	3.28	18.2	--	2371	2.56
	16	6.40	22.0	--	2117	2.70
	23	9.98	24.0	28	4399	1.30
	30	2.52	22.5	30	2457	1.74
July	7	2.95	24.0	31	1941	3.20
	14	4.35	24.0	25	2187	2.18
	21	1.70	24.8	26	1874	1.46
	28	3.50	26.0	28	1727	1.59
Aug.	4	3.97	26.0	24	1838	1.39
	11	3.80	26.0	27	1797	1.59
	18	4.25	24.0	30	1831	1.53
	25	4.95	23.0	29	1746	2.62
Sept.	1	3.35	23.0	29	2087	2.11
	8	3.96	21.5	14	1766	1.96
	15	4.10	20.0	12	1776	2.21
	22	2.70	19.0	21	1833	1.65
	29	4.27	18.0	12	1960	1.80

\* Week average ending Thursday.

\*\* Daily average week ending Sunday inclusive, based on flows at Gulf Island Dam.

Water Temperatures. During the past seven years, the temperature of the water at Gulf Island Dam has been measured each Thursday from early May through September. The water was taken at a depth of about ten feet. The average monthly averages are recorded in Table T.2.

This year a continuous recording thermometer was installed at the Dam to measure the temperature at a twenty foot depth near the center gate. Owing to delay in delivery of the thermometer, an instrument which gave recordings approximately 0.5 degree was first installed and then replaced later on by a more accurate instrument.

A study of the continuous record revealed

1. the temperature rose to  $20^{\circ}\text{C}$  on June 6 and remained at this level until June 13 when the temperature again increased and did not return to  $20^{\circ}\text{C}$  until September 12.
2. the highest temperature of the season was on August 9 from 3:00 to 11:00 p.m. when  $27.4^{\circ}\text{C}$  ( $81.3^{\circ}\text{F}$ ) was recorded.
3. the water was above  $27^{\circ}\text{C}$  on July 29, 31, and August 9.
4. from August 3 to August 12 the temperature was continuously above  $26^{\circ}\text{C}$ .
5. on September 11, the water temperature decreased to just below  $20.5^{\circ}\text{C}$  and slowly became cooler thereafter.



Table T.1.

Water Temperatures °C. Androscoggin River  
Lewiston  
Monthly Average

Year	May	June	July	Aug.	Sept.
1949	15.9	20.5	24.7	24.8	20.2
1948	10.5	17.4	23.3	23.9	21.0
1947	10.6	16.6	24.4	24.9	22.0
1946	12.9	19.6	23.4	21.5	18.8
1945	11.2	17.5	22.5	23.3	19.4
1944	11.2	18.8	22.9	23.6	19.8
1943	10.0	18.3	22.7	21.0	17.7
7 yr. aver.	11.77	18.38	23.41	23.28	19.70
1949 comp. with aver.	+4.1	+2.1	+1.3	+1.5	+0.5

Table T.2.

Water Temperatures  
Gulf Island Dam  
Monthly Averages\*

Year	May	June	July	Aug.	Sept.
1949	16.0	20.3	24.0	24.5	20.0
1948	10.6	18.5	24.2	24.7	21.4
1947	10.6	16.6	25.2	25.6	22.3
1946	13.0	20.8	25.5	22.5	20.9
1945	11.4	18.2	23.5	23.8	20.4
1944	11.6	20.7	24.4	24.6	19.8
1943	10.8	19.5	23.6	22.4	18.0
(1942)	(-)	(-)	(23.6)	(24.0)	(20.0)
7 yr. aver.	12.00	19.23	24.34	24.01	20.40
1949 comp. with aver.	+4.0	+1.1	-0.3	+0.5	-0.4

Water temperatures  
Lewiston and  
Gulf Island Dam.

Tables T.1. and T.2. were compiled from the weekly reports. The average degrees recorded at Lewiston were above the seven year average from May through September and the record for May, 1949, was 4.1°C. above the average. While the temperature obtained at Gulf Island Dam were higher than the average in May, June and August, they were slightly lower than the mean during July and September.